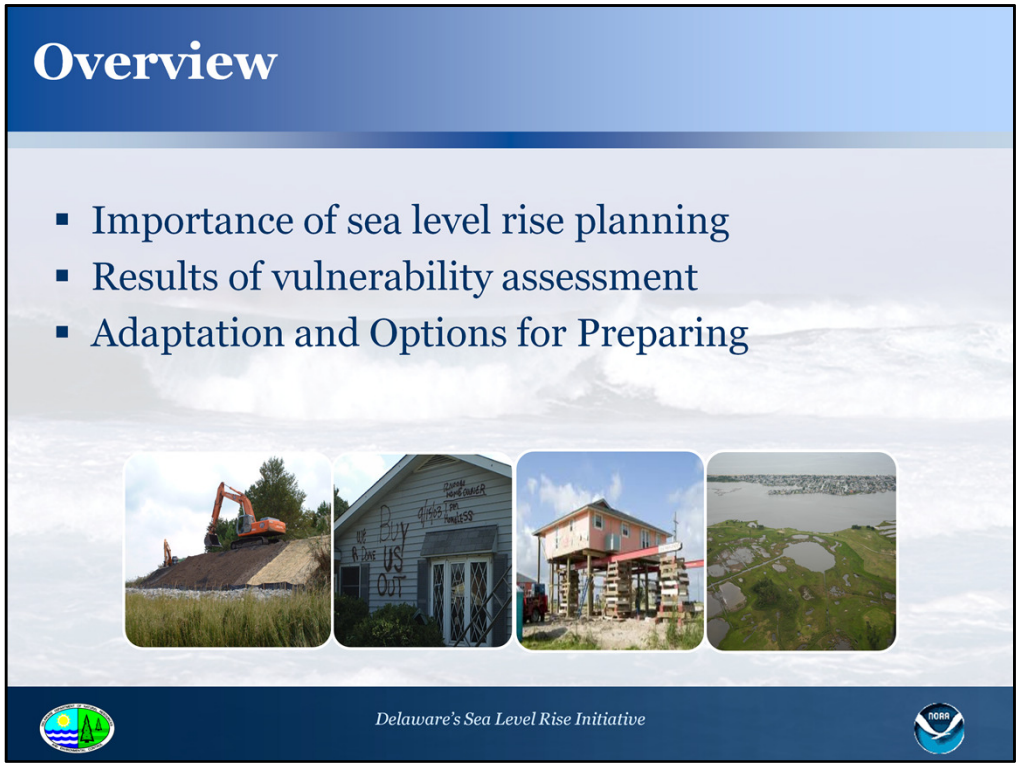
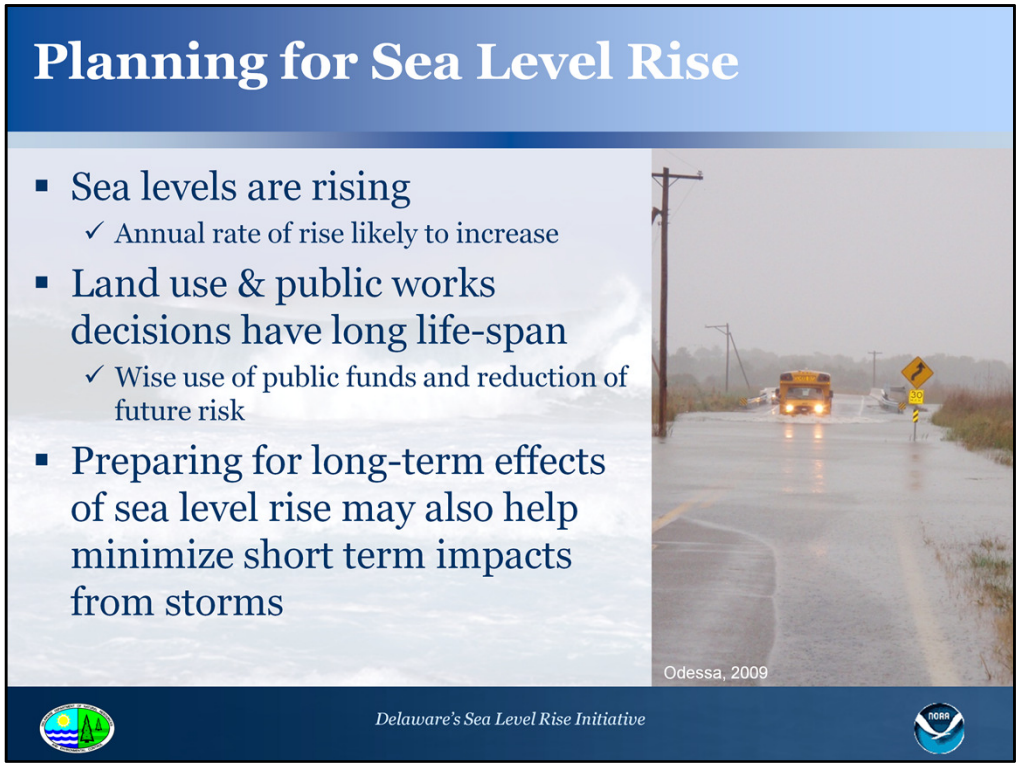
Welcome! Thank you for coming, we are very glad you have taken the time to be here tonight and look forward to sharing our work with you.

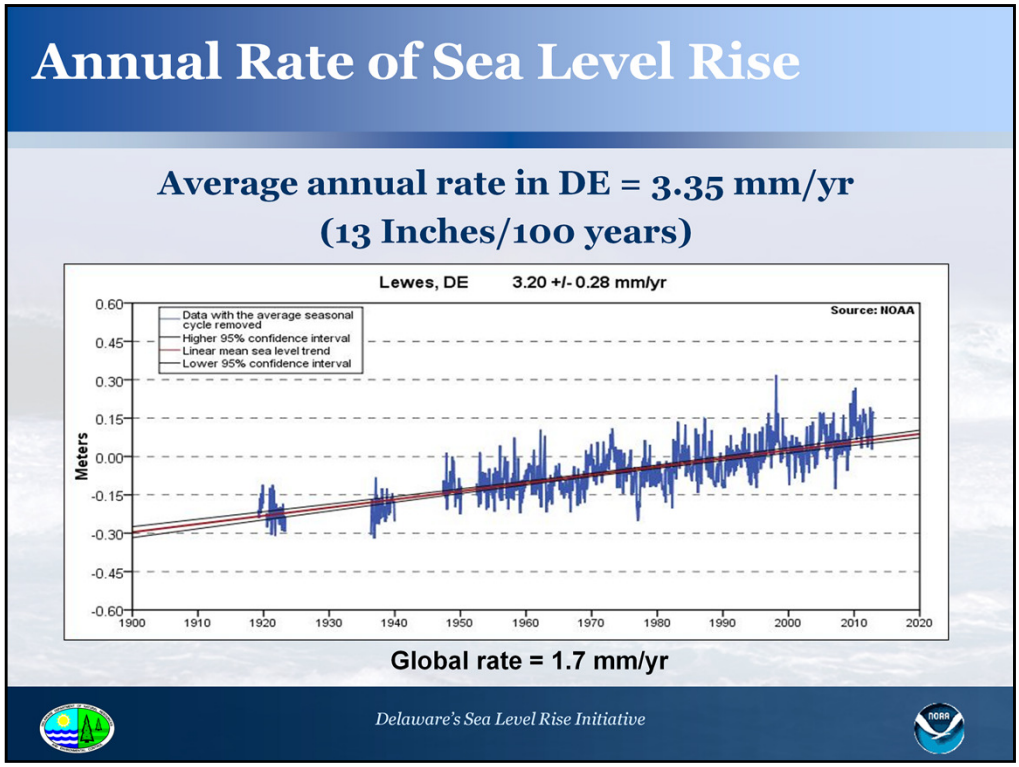
Today, we are presenting OPTIONS that may help the State prepare for sea level rise. We are seeking your feedback on these options and other ideas you may have.



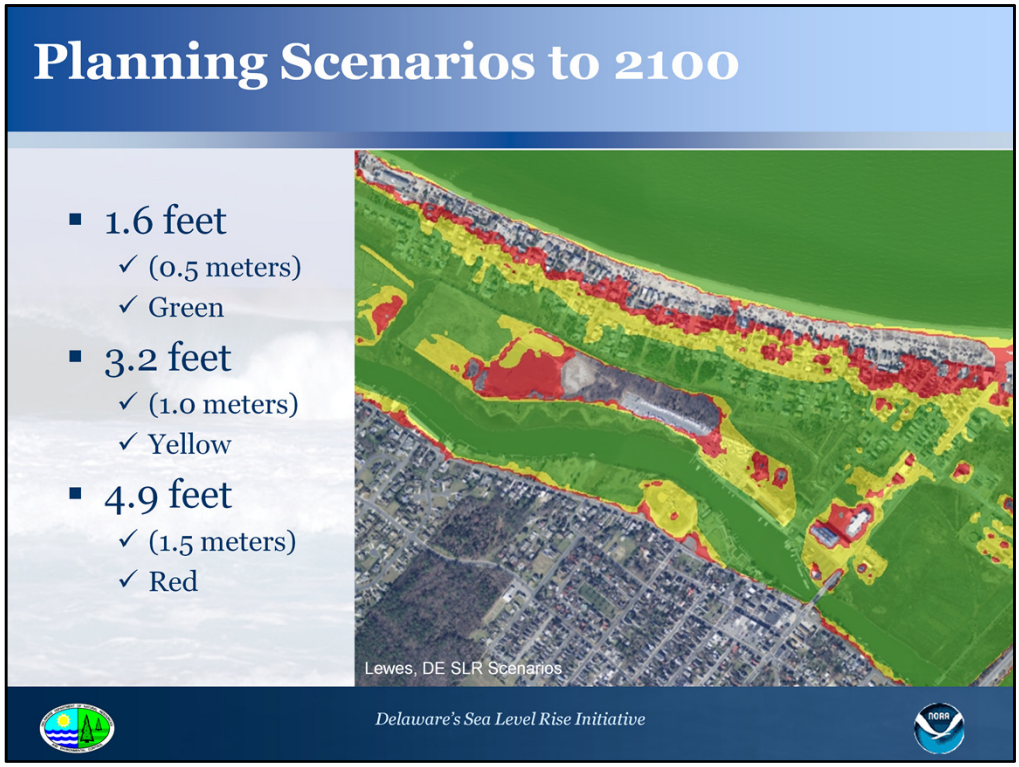
In my presentation today, I will give you a brief background of sea level rise planning in DE, including a few highlights from the recently completed statewide vulnerability assessment. I will also talk about ADAPTATION, or, actions that can be taken on the ground to respond to sea level rise. Finally, I will talk about the 61 OPTIONS for PREPARING that we are presenting to you tonight and that we would like feedback from you about.



Delaware is planning for between 1.6 and 4.9 feet of sea level rise by the year 2100. You may ask yourself "why are you planning for sea level rise now if the effects are so far into the future?" The current rate of sea level rise in Delaware is about 13 inches per 100 years. Climatologists believe that this rate will increase in coming decades. Land use decisions, public works decisions and habitat management decisions have long life spans; considering future sea levels in their design and placement is a wise use of public funds and reduces future risks to people and property. In addition, making better decisions now using future sea levels as a guide may also help minimize short term impacts from storms. Delaware is just one of more than a dozen coastal states that are investigating the potential impacts of sea level rise and developing plans to adjust to the changing coastline.



This graph shows tide gauge data collected at Lewes Delaware since the 1920s. This gauge shows that the rate of sea level rise in Lewes is 3.2 millimeters per year, or about 13 inches over 100 years. Averaged with the Reedy Point Gauge, Delaware's average rate is 3.35 millimeters per year. Other gauges in the region show similar trends, from 3-4 millimeters per year. The global average rate is 1.7 millimeters per year. As you can see, Delaware's rate is roughly twice that of the global average. This is due to the fact that Delaware is "subsiding" or sinking. More information about this is available at the poster displays.



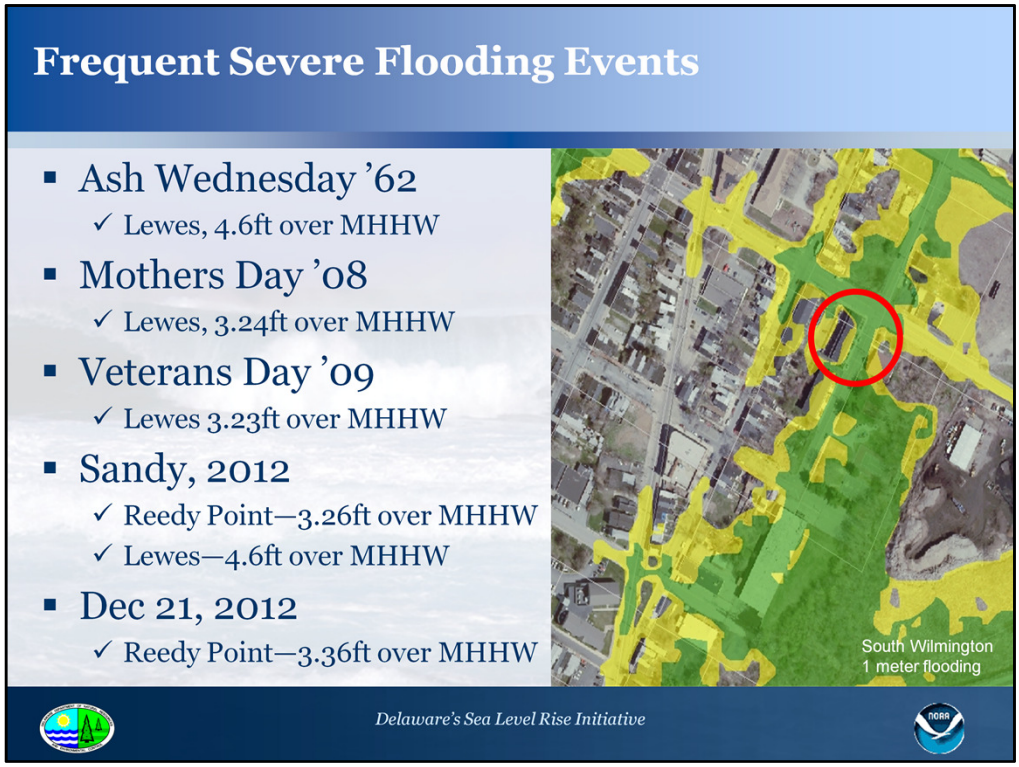
DNREC commissioned a technical workgroup to review the best available science and recommend planning scenarios for sea level rise. Based upon their review, they recommended three planning scenarios: 1.6 feet (0.5 meters), 3.3 feet (1 meter) and 4.9 feet (1.5 meter). These scenarios take into consideration both the predications for global sea level rise and Delaware's rate of subsidence (sinking). They project out to the year 2100.

These scenarios form the basis of a DNREC internal policy for sea level rise planning and have also formed the basis of the Sea Level Rise Advisory Committee's vulnerability assessment.

This map of Lewes shows what these scenarios would look like on the ground if assuming no action is taken. The green shows 1.6 on top of mean higher high water (an average of the high tides); the yellow shows 3.2 feet on top of MHHW and the red shows 4.9 feet above MHHW. These maps are available to everyone online as an interactive viewer and we also have it available for your use tonight. (http://de.gov/slrmap).

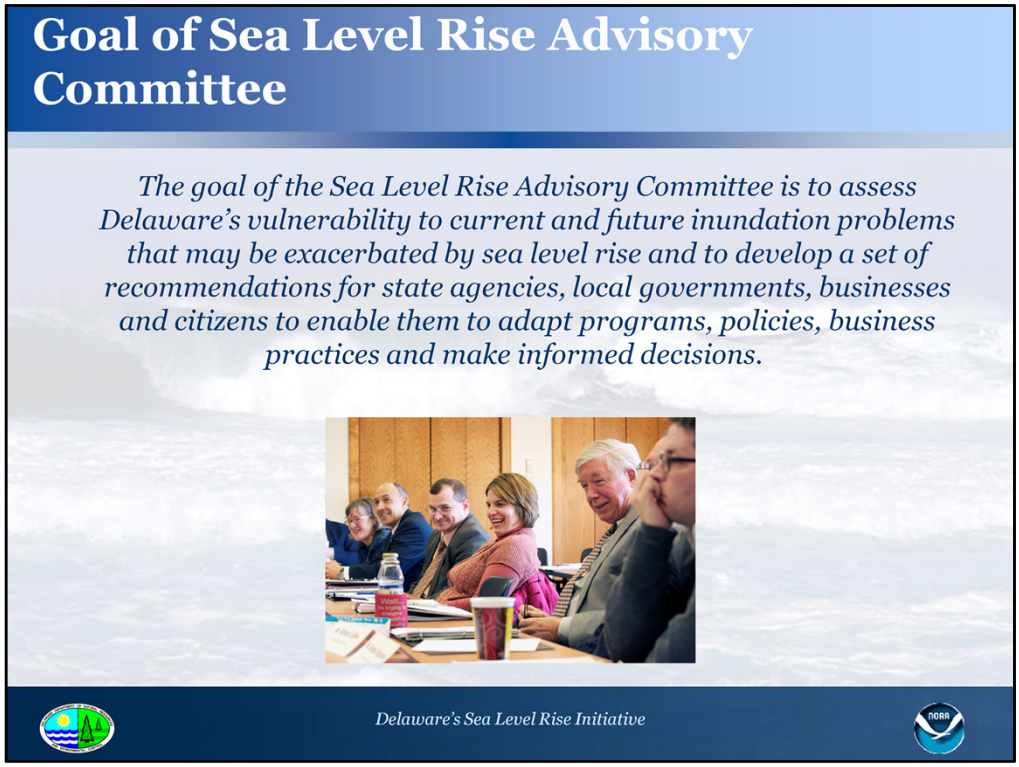
These future scenarios are important because potential impacts of sea level rise, if no action is taken to prepare or adapt, could significantly impact our economy, environment and communities. Impacts include increased extent of periodic flooding that occurs during storm events, permanent inundation of low-lying coastal areas and saltwater intrusion into surface waters and ground water. All of these have secondary economic, social and environmental impacts ranging from reduced crop yields, to damaged homes and infrastructure and loss of wildlife habitat and outdoor recreational opportunities.

It is important to note that Delaware is routinely seeing flooding of 3.2 feet above MHWW now, and these large flooding events are not limited to nor'easters or hurricanes. On December 21 of last year, we had a storm anomaly that caused tide levels in New Castle to exceed the tide levels during Sandy. This picture shows Bradford Street in Wilmington, Delaware.



This map shows what 0.5 meters and 1.0 meters of sea level rise looks like in South Wilmington – it also fairly accurately predicts what areas flood during storms like the Dec 21st storm.

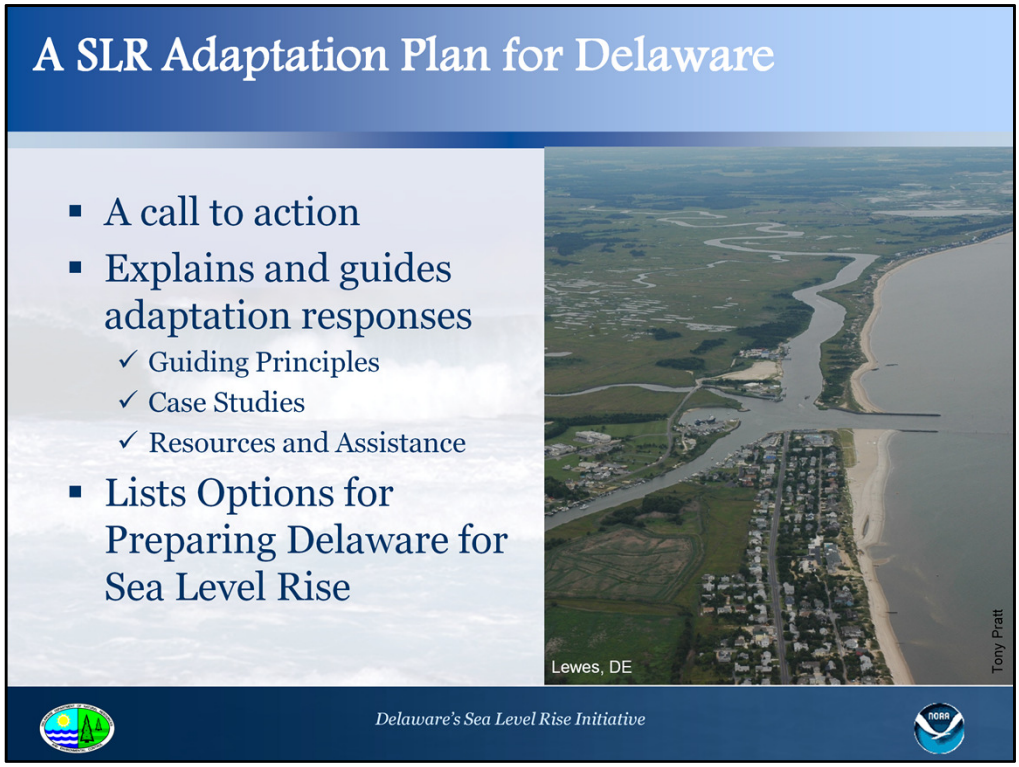
There is a recognized need to do a better job of reducing flood damages in Delaware, but if we prepare for flooding using only past storms as our guide, we will be underprepared (and underwater). Looking towards 2100 and using the sea level rise scenarios to help us plan our flooding response will help ensure that whatever flood protection measures we choose to build will be effective for the long term.



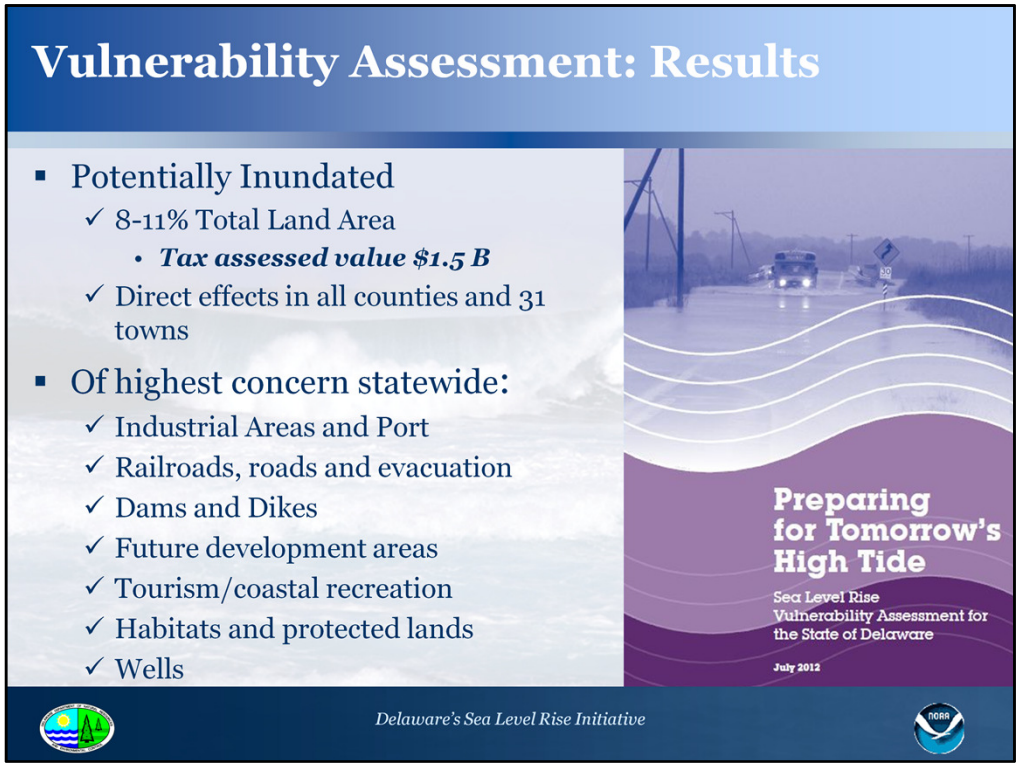
To address these potential impacts at a statewide scale, DNREC Secretary Collin O'Mara formed the Sea Level Rise Advisory Committee in the Fall of 2009. Their first meeting was held November of 2009. The committee was tasked with assessing Delaware's vulnerability to inundation from sea level rise and developing recommendations to adapt to its potential effects. The goal statement is above. The final product will be an "adaptation plan" – a document which describes the potential impacts, and recommends actions that can be taken. The final product will be a guidance document for governments, businesses and individuals. It will not create new regulations or legislation.

The Advisory Committee has members from a diverse range of interests including business organizations, environmental organizations, citizen organizations, local governments and state agencies. The chair of the Committee is Sarah Cooksey, Administrator of the DNREC Delaware Coastal Programs. The Co-Chair is Pam Thornburg-Bakerian from the Delaware Farm Bureau.

The committee is staffed by scientists and planners from the Delaware Coastal Programs. It is funded through a Coastal Zone Implementation Grant from the National Oceanic and Atmospheric Administration.



The final product of the SLRAC will be a Sea Level Rise Adaptation Plan—a document that will be a reference for those choosing to begin adaptation planning. Central to the document will be a list of Options for Preparing Delaware for sea level rise. Once the document is finalized, the Delaware Coastal Programs will begin working with local governments, state agencies, citizens and the federal government to implement as many options as possible. The goal being to continuously improve Delaware's preparedness for sea level rise.



The first phase of the adaptation planning process was development of a vulnerability assessment. The statewide sea level rise vulnerability assessment was completed in July 2012 and published in September 2012. It assessed 79 different resources ranging from wells and septic systems to roads to wetlands. It found that sea level rise will impact all of Delaware, with direct effects in all three counties and 31 of our 57 towns. 8-11% of our total land area could be inundated, or permanently flooded, by sea level rise under the three scenarios.

Of the 79 resources, the committee found that 16 were of special concern: industrial areas and ports, railroads, roads and evacuations routes, dams and dikes, future development areas, tourism, habitats and protected lands, wells and others.

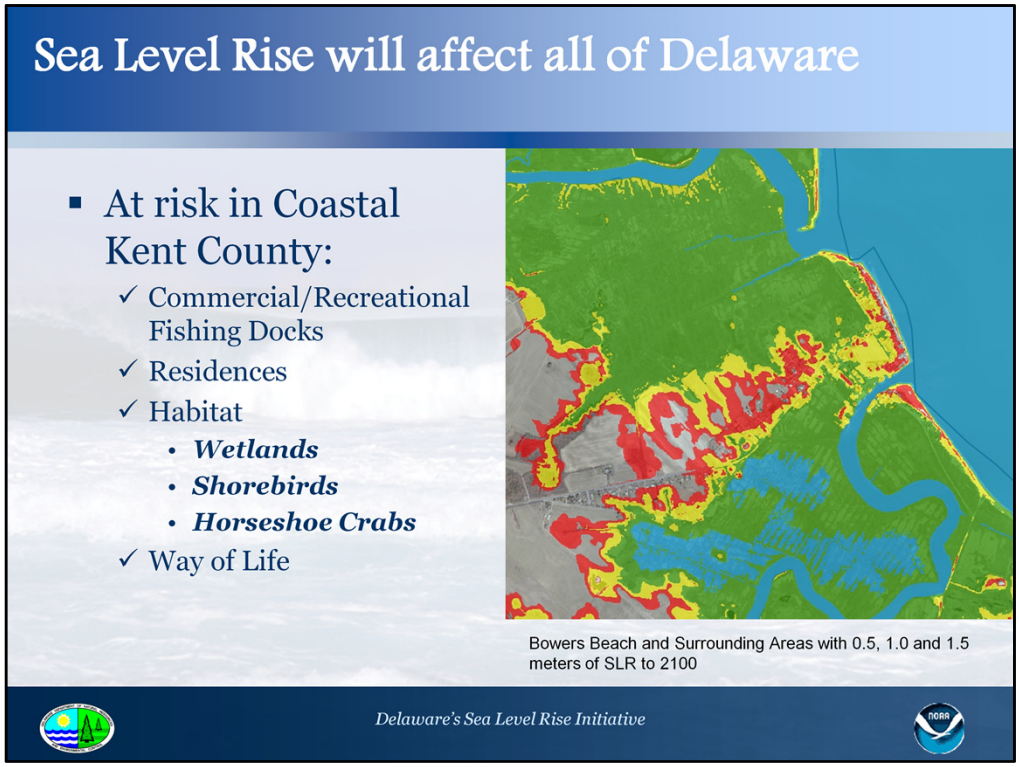
SLR will affect all of Delaware

- In Urban Areas in Northern DE:
  - ✓ Transportation Networks
  - ✓ Neighborhoods
  - ✓ Economic Development Zones
  - ✓ Public Safety Facilities
  - ✓ Sewer Lines/Capacity

South Wilmington and Surrounding Areas with 0.5, 1.0 and 1.5 meters of SLR to 2100

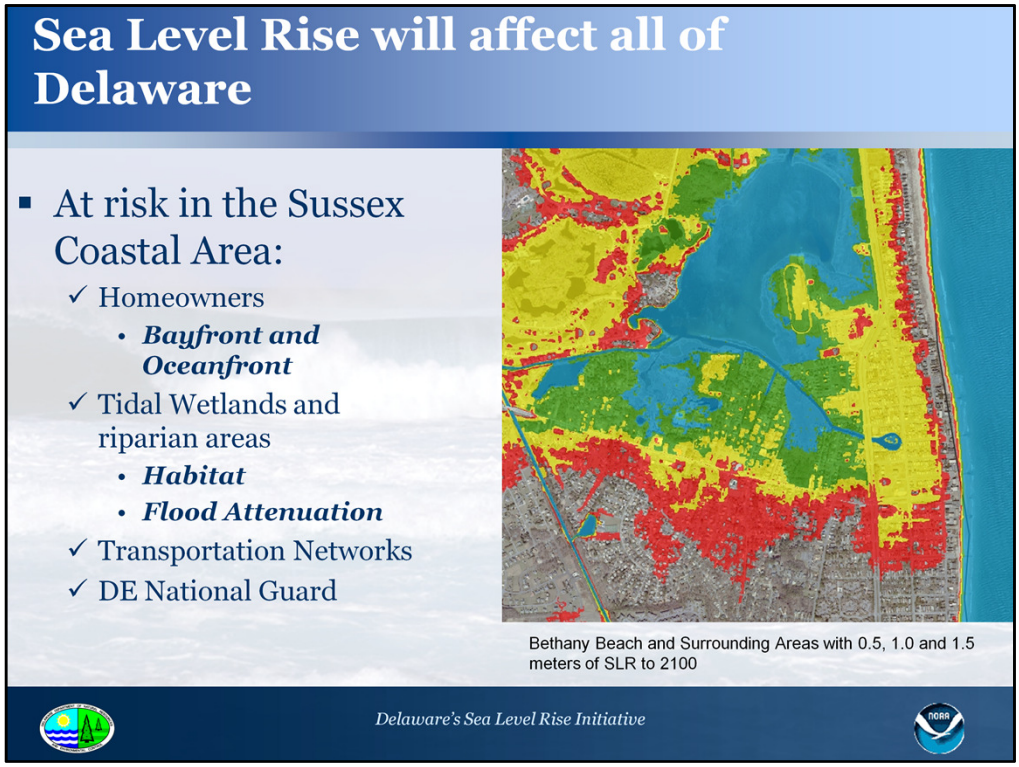
Delaware's Sea Level Rise Initiative

I like to make sure that everyone understands that SLR is not an issue that affects only those with beach homes. This is a statewide, regional and national and worldwide issue. In South Wilmington, you will see significant impacts without action.

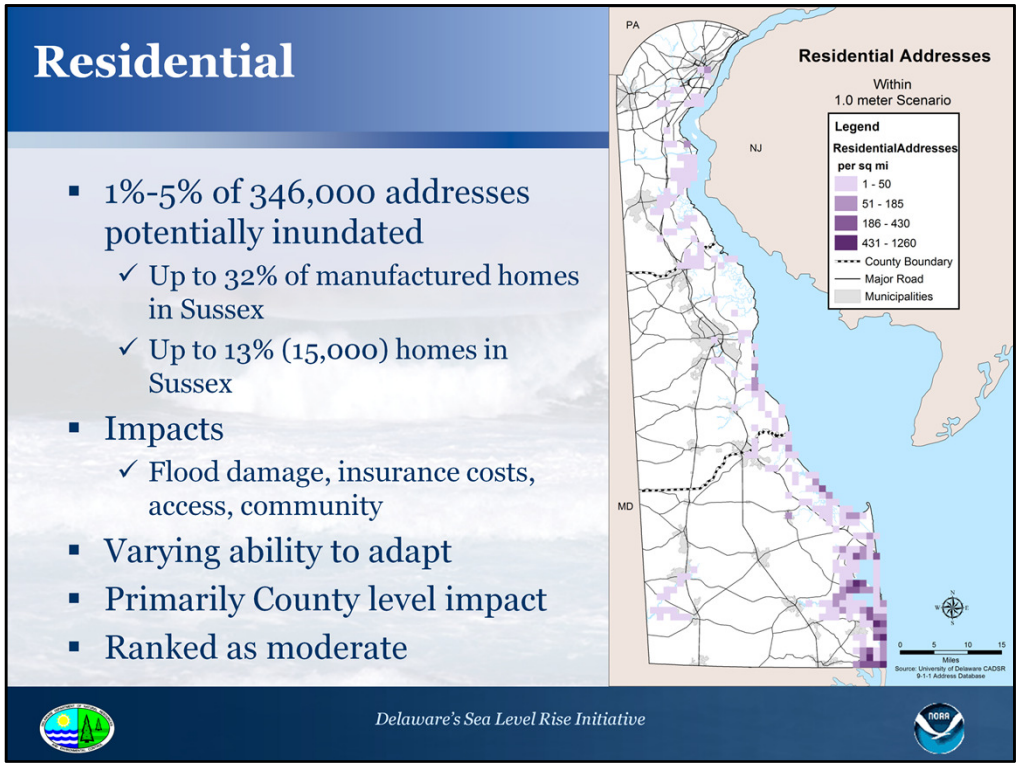


In Coastal Kent County, much of the impact will be natural resources rather than homes and industry.

While the pictures here show potential inundation, all residents inland could also be affected from transportation issues, lack of access to recreation, increased taxes for flood impacts etc.

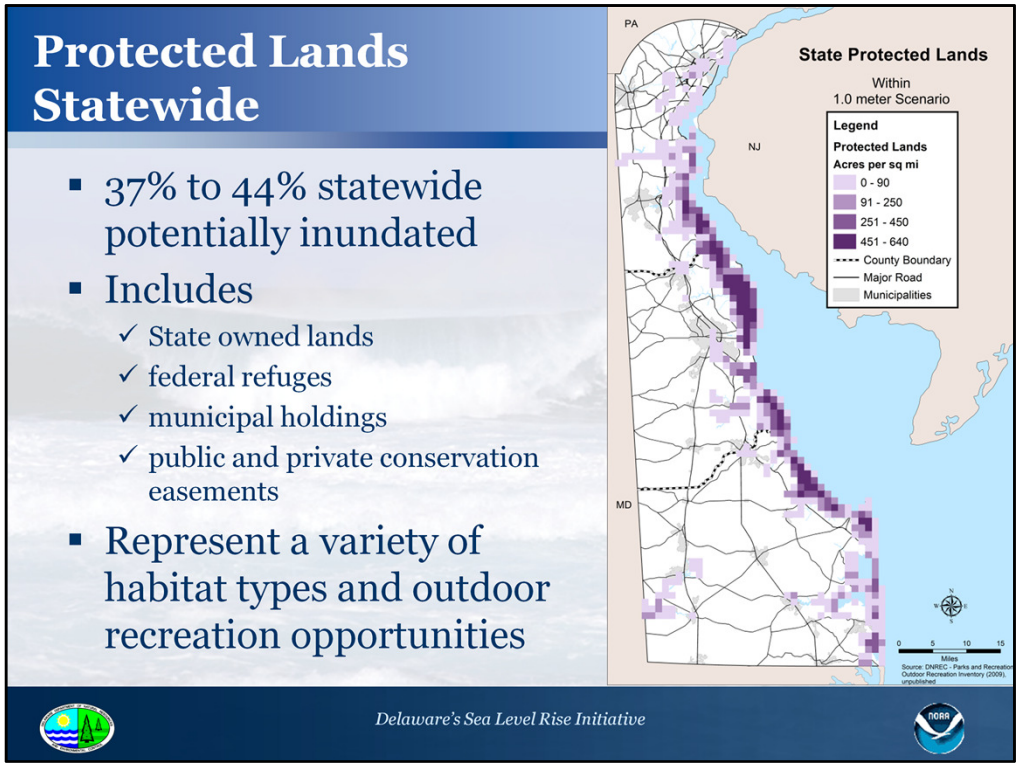


Beach communities are also at risk, but so are back bay communities. You can see that according to this map, many beach-front homeowners may not be flooded—however, this assumes that state and federal governments continue to replenish beaches. While these homes may not be flooded, issues with transportation and wastewater may render a home uninhabitable.



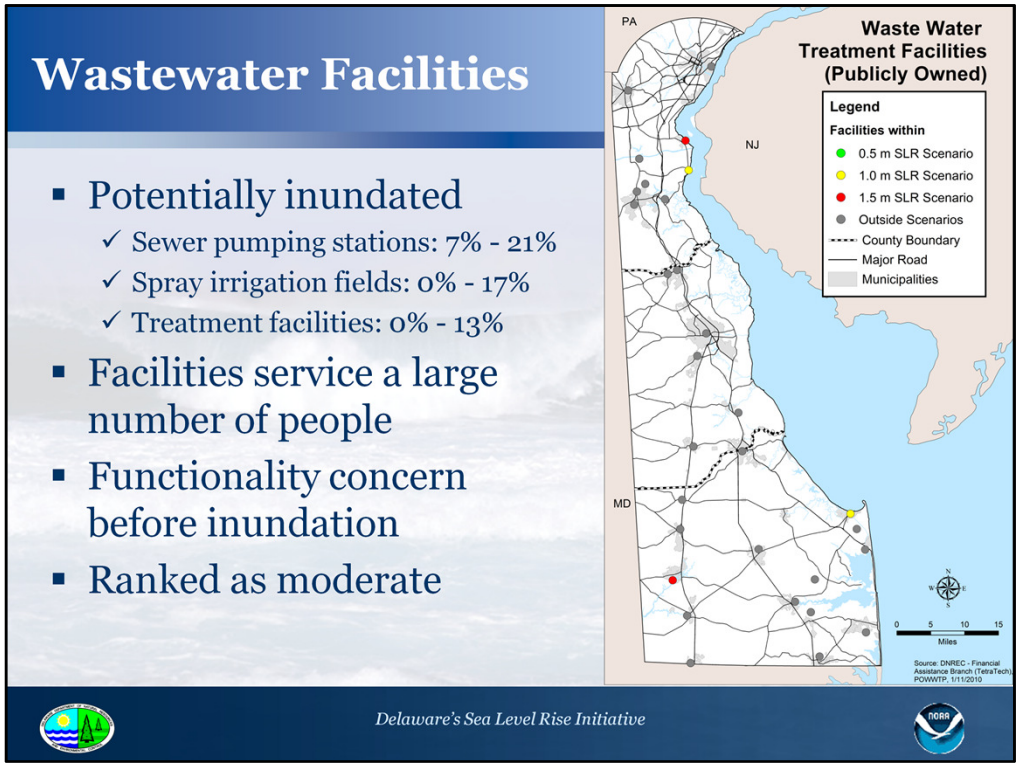
I'd like to quickly highlight a few of the findings from the Vulnerability Assessment. If you would like to know more, CDs of the assessment are available, and it can be downloaded online at: http://de.gov/slrva

Over 17,000 homes could be inundated by sea level rise at the 1.5 meter scenario; these homes are primarily located in Sussex County, who would also see over 30% of its manufactured homes at risk.

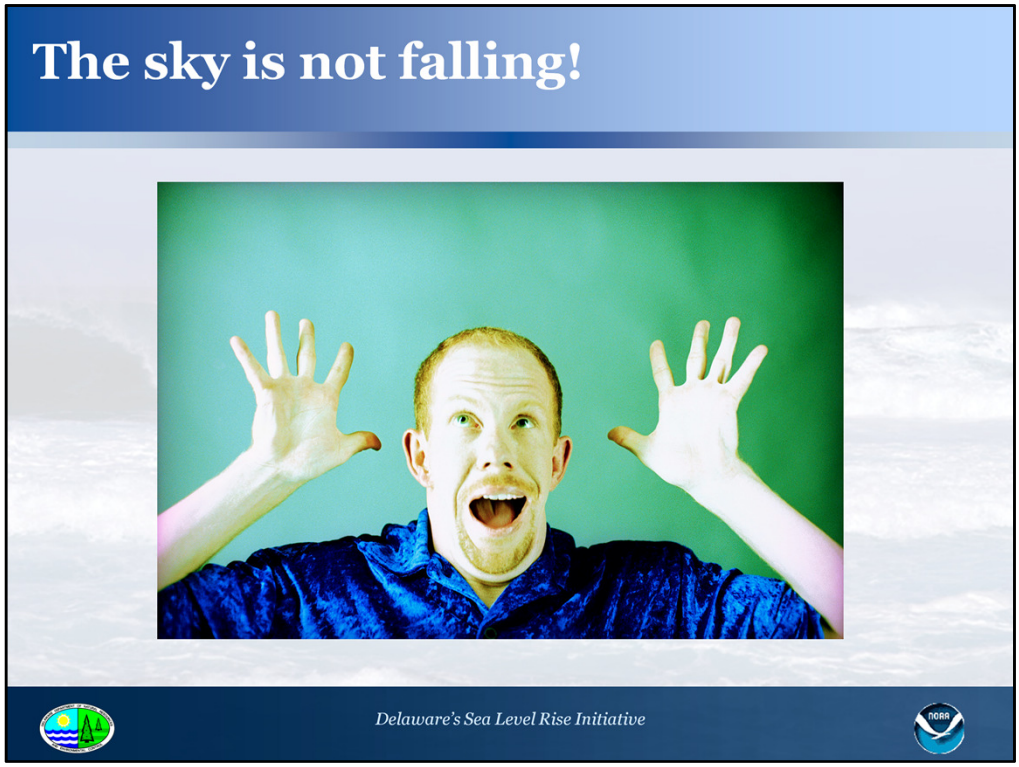


Protected lands represent a variety of lands including State owned properties such as wildlife areas, parks, state forests, boat ramps, natural areas, nature preserves, and historical sites; federally owned wildlife refuges (Bombay Hook and Primehook); municipal holdings such as municipal parks, open space, and recreational facilities; and public and private conservation easements.

State and federal governments, and non-profit agencies have spent considerable resources permanently protecting these areas, which are important for wildlife hemispherically. If these natural areas cannot adjust to keep pace with sea level rise, they may be permanently lost.



Statewide, wastewater infrastructure is also at risk. This map shows publically owned wastewater treatment facilities; up to 13% of these could be inundated by sea level rise. Although few in number, these plants serve a large number of our residents and maintaining their functionality is important for human health and water quality.



This may all seem like bad news, but I'm here today to tell you that we can take steps to prevent or minimize the damage.

"Adaptation" simply means the way that we choose to respond. There are four primary ways to respond:

Protect = Building Protective Structures to hold back water

Accommodate = changing behaviors and lifestyles to deal with encroaching water

Retreat = Moving structures out of flooded areas and/or letting nature take its course

Avoid = not placing new structures in at risk areas

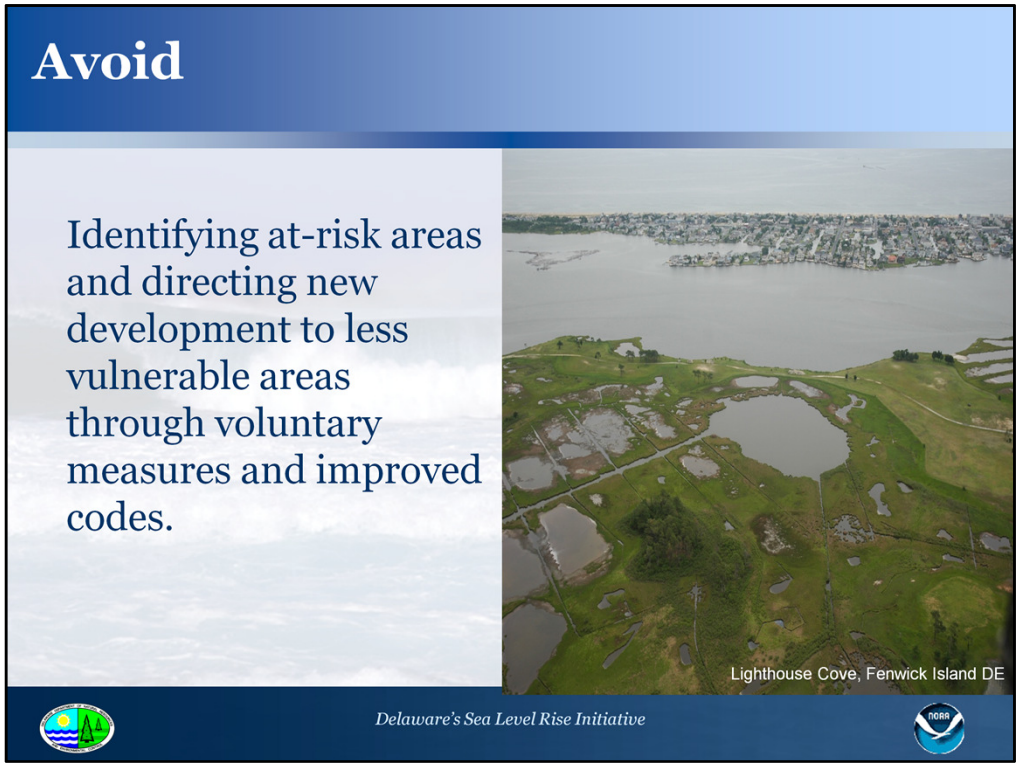
A Strategy of Protect means that you would choose to build structures that would hold the water back. This would include Dikes, sea walls, bulkheads and beach replenishment projects. Many places along our shoreline have already chosen to adapt in this way. We have a long-standing program of beach replenishment, in partnership with the Federal government, that has by and large, kept our ocean and bay beaches in place, providing recreation and storm protection. We also have a series of dikes in the northern part of the state that have kept water out of New Castle and other locations – these dikes are now undergoing serious repair. This is a primary issue with the protection strategy—maintenance of the structure, particularly after storm damage.

An accommodation strategy seeks to reduce flood damages without building structures that may fail in the future or require repair. This strategy could be used together with other strategies. Accommodation includes those high heeled flippers I showed you earlier, plus raising homes above the flood elevation, flood-proofing structures with flood doors and windows. It also includes paying attention to storms – evacuating early and maybe avoiding certain roads at high tide.

A planned retreat strategy would remove structures from at-risk areas and allow the shoreline to move naturally inland. Retreat is the most likely strategy for many of our natural areas and wetlands that will likely move inland over time. Retreat strategies for communities is a much more difficult topic, but it has recently been done in Delaware.

There is another retreat strategy: UNPLANNED retreat. Unplanned retreat could occur as a result of putting off decision-making; this is why we are talking about Adaptation to SLR now. By putting off difficult or costly decisions, we could inadvertently be choosing to retreat.

A retreat strategy was implemented in community of Glenville in New Castle County, not because of sea level rise, but because of frequent flooding caused by development upstream. This project had great emotional and economic cost. Folks, this is not an easy topic to discuss but one that is worth the conversation.



An Avoidance Adaptation Strategy is one where we identify areas that will be affected by sea level rise in the future and direct growth away from those areas, minimizing future risks. Avoidance can be accomplished through land use ordinances and development codes, but also through land preservation and conservation easements.

Choosing how to adapt will, in some cases, be up to individuals and landowners. In some cases, decisions may be made at the community or municipal level. In some cases, particularly for infrastructure, decisions may be made by state and federal government, in consultation with communities. In many cases, an adaptation strategy might contain components of retreat, accommodate, protect and avoid.

An adaptation strategy that is right for one place may not be right for another. And so, adapting to sea level rise will most likely be done on a case-by-case basis throughout the state.

But that's not what we are talking about tonight!

Tonight, we are discussing Options that will help Delaware prepare to Adapt. In some cases, a selected adaptation strategy may run into a brick wall. Perhaps there is not enough data; perhaps there is not enough funding. Perhaps government regulations haven't yet envisioned the need for a certain new technology for shoreline stabilization. Perhaps government entities aren't working together or working towards the same goals.

For the past 6 months or so, the SLRAC has been focusing its work on this question: What changes can we make now that will make it easier to put adaptation strategies into place in the future? How can governments work better together? How can we provide information to citizens? How can we improve the data we have for making decisions? How can regulations and policies be updated or streamlined?

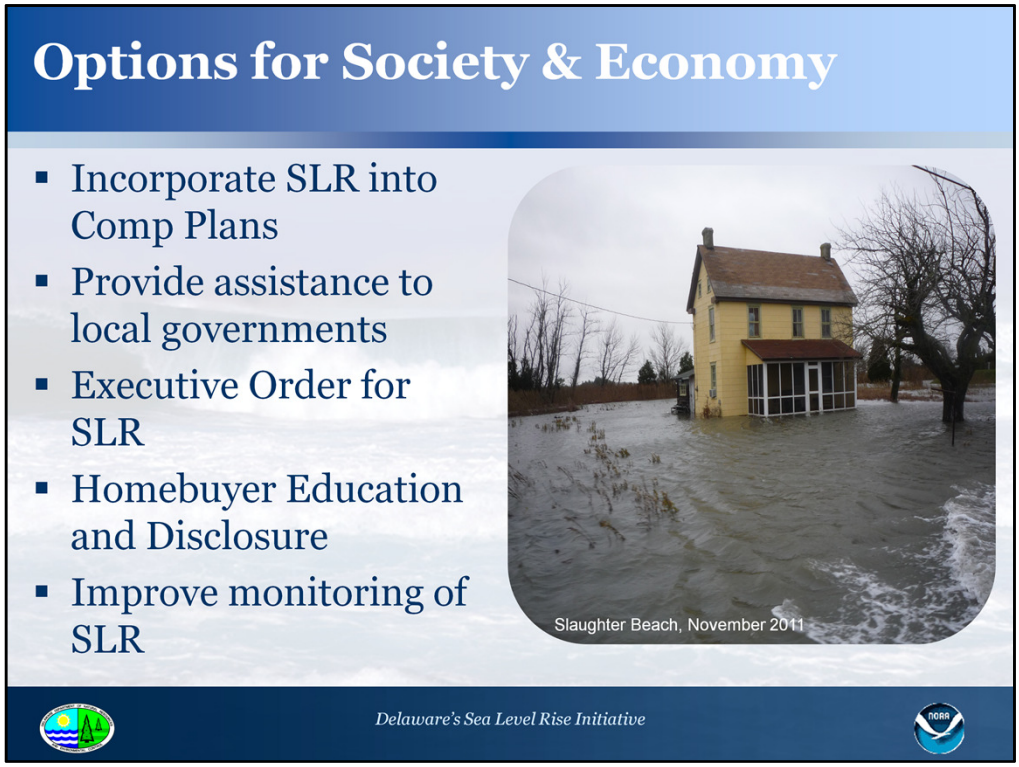
To answer these questions, we held focus groups in October, and have had many great discussions. The result is a set of 61 Options for Preparing for Sea Level Rise and we are asking for your feedback on these options for the SLRAC to consider.

The options that we are discussing tonight cover a range of topics, but can be lumped into 6 categories: Improving Coordination and Communication, Providing Increased Regulatory flexibility and providing consistency between regulatory agencies, Providing consistent policies for growth and development, Increasing public awareness of the risk and adaptation strategies, improving sea level rise data sets so that we can make better decisions, and providing technical assistance to those who want it.

We have further divided these up for tonight's workshop to align with the chapters in the Vulnerability Assessment, so that if you have a particular interest, you can head straight there and discuss these options in detail with our committee members.

Options targeted towards Public Safety and Infrastructure include finding ways to work with surrounding states and the Feds on interstate projects and sharing info; coming up with ways to pre-permit infrastructure projects that consider sea level rise; incorporating sea level rise into designs and ordinances; incorporating sea level rise into long-range transportation plans and reaching out to wastewater operators.

We would like to have your feedback on these options, and see if you have other ideas for the committee to consider.



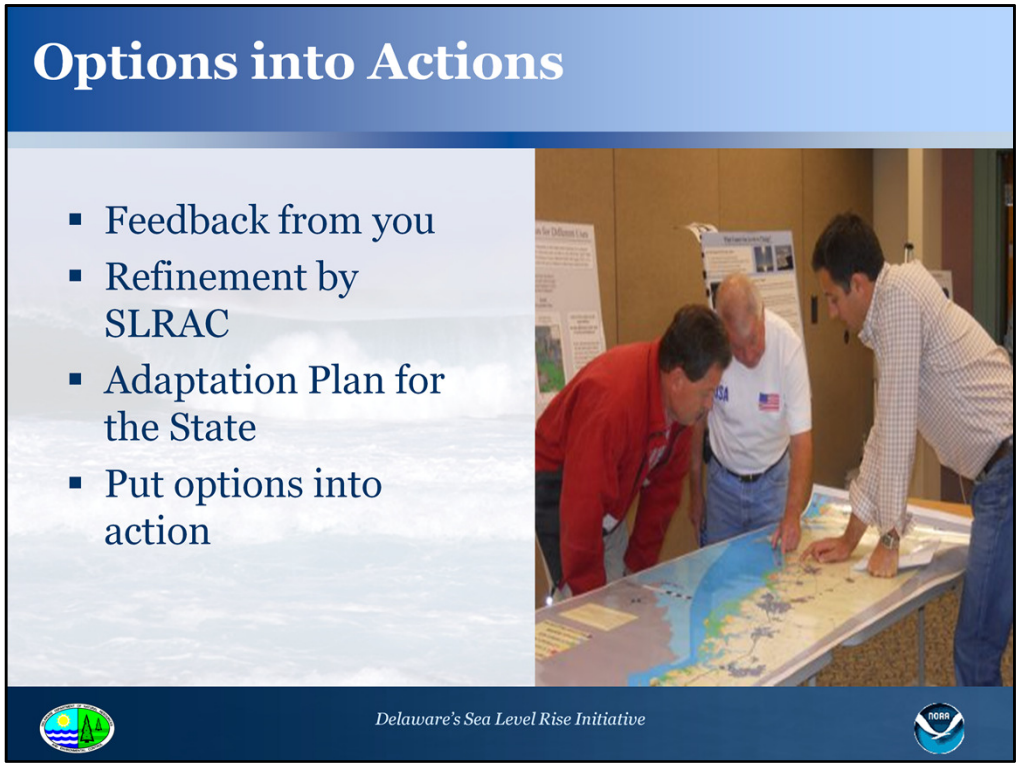
Options for Society and Economy including incorporation of sea level rise into many planning documents, including comprehensive development plans and the State Strategies for Policy and Spending; providing technical assistance to local governments for planning adaptation, having the Gov sign an executive order that would direct all state agencies to use the same info and work together, and improving the monitoring of SLR. The idea of homebuyer educations and/or adding real estate disclosures on sea level rise is also included in the

these options.

We would like to have your feedback on these options, and see if you have other ideas for the committee to consider.

In the Natural Resources category, options for preparing focus on improving data for decision-making, like understanding how surface water salinity may change and whether groundwater will be impacted by saltwater. Options also include updates to regulatory maps used for wetlands permitting and drafting comprehensive strategies for wetlands restoration that incorporate sea level rise.

We would like to have your feedback on these options, and see if you have other ideas for the committee to consider.



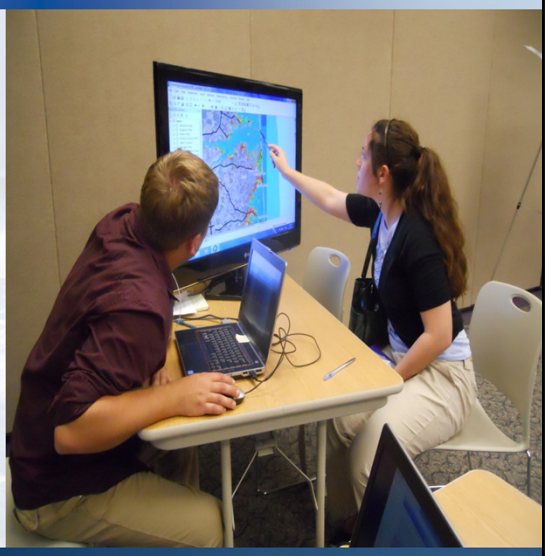
At this point, you may be asking yourself what we are going to do with these options, and what we want you to do.

The SLRAC came up with these options as a starting place and wants your input on them – what do you need to adapt to sea level rise? Are they covered in these lists? Are there items you think we should not pursue? Are there options you have thought of that aren't on the list? We would like to know. Comments are due March 14.

When we get your feedback, the SLRAC will review it and make refinements to the list. Some ideas may be tossed out, we may add new ideas and others may be amended or clarified. After that, staff from the DE Coastal Programs will go into high gear writing the State Adaptation Plan.

Visit Each Station to Learn More

1. Welcome table
2. Sea Level Rise Adaptation & Options for Preparing
3. Natural Resources Options
4. Society and Economy Options
5. Public Safety and Infrastructure Options
6. Interactive sea level rise map
7. State of Delaware sea level rise maps
8. Comment table



Opportunities to get involved

- Provide Comments
  - ✓ On paper or Online
- Sign up for our Email List for updates
- Comment on the Draft Adaptation Plan
- Start your own Adaptation Plan!

Delaware's Sea Level Rise Initiative

Thank You!

Committee members and staff look forward to talking with you and answering your questions in the main display area.

Submit Comments tonight or online

http://de.gov/adaptationengagement

or email to

DNREC_DCP_PublicComment@state.de.us